

Patent Claims:A3
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1. ~~Device for producing plastic pipes, with an extruder and a pipe head (1), characterized through a vacuum suction bell (2) connected in the production direction to the pipe head (1) and formed by a vacuum-tight chamber (30) with a vacuum connection (5), and through measuring instruments inside the chamber (30), which detect the outside diameter of the pipe-shaped molten extrusion and, by changing the vacuum, alter the outside diameter of the molten extrusion in a controlled manner.~~

2. Device according to claim 1, characterized by the fact that the measuring instruments operate with sensing tools resting on the outside wall of the pipe.

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3. ~~Device according to claim 1 or 2, characterized by the fact that the measuring instruments control the outside diameter of the pipe (10) in a touch-free manner.~~

4. Device according to claim 3, characterized by the fact that the measuring instruments control the outside diameter of the pipe (10) by means of sound or light sensors.

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5. ~~Device for producing plastic pipes with an extruder, a pipe head (1) connected to the extruder in the direction of production, and a vacuum suction bell (2) connected in the production direction to the pipe head (1) and formed by a vacuum-tight chamber (30) with a vacuum connection (5), whereby inside the chamber (30) measuring instruments detect the outside diameter of the pipe-shaped molten extrusion and, by changing the vacuum, alter the outside diameter of the molten extrusion in a controlled manner, characterized by the fact that during the production phase the mass gap of the pipe head (1) is adjustable and provision is made for a calibrating station, connected to the vacuum suction bell (2), for the outside diameter of the pipe, in which station different pipe dimensions can be set during the production phase, and a vacuum calibrating bath (4) is connected to the calibrating station (3), in which bath the pipe (10) is cooled and hardened and leaves the vacuum calibrating bath (4) through a vacuum seal (9) that adjusts automatically to the pipe diameter.~~

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Patent Claims:

- [1. Device for producing plastic pipes, with an extruder and a pipe head (1), characterized through a vacuum suction bell (2) connected in the production direction to the pipe head (1) and formed by a vacuum-tight chamber (30) with a vacuum connection (5), and through measuring instruments inside the chamber (30), which detect the outside diameter of the pipe-shaped molten extrusion and, by changing the vacuum, alter the outside diameter of the molten extrusion in a controlled manner.]
1. Device, with an extruder and a pipe head (1), for producing plastic pipes, with a vacuum suction bell (2) connected in the production direction to the pipe head (1) and formed by a vacuum-tight chamber (30) with a vacuum connection (5), characterized through measuring instruments inside the chamber (30), which detect the outside diameter of the pipe-shaped molten extrusion and, by changing the vacuum, alter the outside diameter of the molten extrusion in a controlled manner.
2. Device according to claim 1, characterized by the fact that the measuring instruments operate with sensing tools resting on the outside wall of the pipe.
3. Device according to claim 1 [or 2], characterized by the fact that the measuring instruments control the outside diameter of the pipe (10) in a touch-free manner.
4. Device according to claim 3, characterized by the fact that the measuring instruments control the outside diameter of the pipe (10) by means of sound or light sensors.
- [5. Device for producing plastic pipes with an extruder, a pipe head (1) connected to the extruder in the direction of production; and a vacuum suction bell (2) connected in the production direction to the pipe head (1) and formed by a vacuum-tight chamber (30) with a vacuum connection (5), whereby inside the chamber (30) measuring instruments detect the outside diameter of the pipe-shaped molten extrusion and, by changing the vacuum, alter the outside diameter of the molten extrusion in a controlled manner, characterized by the fact that during the production phase the mass gap of the pipe head (1) is adjustable and provision is made for a calibrating station, connected to the vacuum suction bell (2), for the outside diameter of the pipe, in which station different pipe dimensions can be set during the production phase, and a vacuum calibrating bath (4) is

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connected to the calibrating station (3), in which bath the pipe (10) is cooled and hardened and leaves the vacuum calibrating bath (4) through a vacuum seal (9) that adjusts automatically to the pipe diameter.]

5. Device according to claim 1, characterized by the fact that during the production phase the mass gap of the pipe head (1) is adjustable and provision is made for a calibrating station, connected to the vacuum suction bell (2), for the outside diameter of the pipe, in which station different pipe dimensions can be set during the production phase, and a vacuum calibrating bath (4) is connected to the calibrating station (3), in which bath the pipe (10) is cooled and hardened and leaves the vacuum calibrating bath (4) through a vacuum seal (9) that adjusts automatically to the pipe diameter.

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[The baffles are not adjustable in their baffle-opening width, but rather only in their distance between one another.

The object of the invention is to create a device in order to achieve during the production phase of the pipe, without interruption of the production process, a fully automatically controlled resetting between several plastic pipe dimensions in the continuous extrusion process, the outside diameter and the pipe wall thickness being adjusted according to customer desires or to standardization, as the case may be.

This object of the invention is attained through the teaching of the main claim.

Advantageous configurations are explained in the dependent claims.

Expressed in different terms, it is proposed that a vacuum suction bell be connected to the pipe head in the direction of production, which vacuum suction bell is formed by a vacuum-tight chamber, to which is joined a vacuum connection; inside the chamber, measurement instruments control the outside diameter of the present molten extrusion and appropriately control the vacuum. Thus, through these means, the molten extrusion can be, for example, sucked up to a larger outside diameter, in order to be then conducted into the devices serving the further processing of the molten extrusion.]

The baffles are not adjustable in their baffle-opening width, but rather only in their distance between one another.

Known from GB-A-21 82 603 is the use of a vacuum-tight chamber with a vacuum connection as a vacuum suction bell. Through the widening of the extrusion emerging from the drawing tool, transversely to the longitudinal axis of the pipe, a better fiber reinforcement of the product in the circumferential direction should be achieved.

In contrast to this, the object of the invention is to create a device in order to achieve during the production phase of the pipe, without interruption of the production process, a fully automatically-controlled conversion between several plastic pipe dimensions in the continuous extrusion process, the outside diameter and the pipe wall thickness being adjusted according to customer desires or to standardization, as the case may be.

This object of the invention is attained through the teaching of the main claim.

Advantageous configurations are explained in the dependent claims.

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Expressed in different terms, it is proposed that a vacuum suction bell be connected to the pipe head in the direction of production, which vacuum suction bell is formed by a vacuum-tight chamber, to which is joined a vacuum connection; inside the chamber, measurement instruments control the outside diameter of the present molten extrusion and appropriately control the vacuum. Thus, through these means, the molten extrusion can be, for example, sucked up to a larger outside diameter, in order to be then conducted into the devices serving the further processing of the molten extrusion.

Subsequently, the mass extrusion reaches a calibrating station, in which different pipe dimensions can be set. To be sure, known from WO 96/36 457 is the method of carrying out minor calibration adjustments in a calibrating station by the fact that through a wedging effect, individual open calibrating rings can be slightly changed in their diameter. With such an arrangement, however, a variation of the pipe outside dimension is not achievable, but rather it is merely counteracted by the contraction behavior. Subsequently to the calibrating station, the plastic pipe, not yet completely hardened, then enters a vacuum calibrating bath, the support rollers of which are adjustable to the desired pipe outside diameter. In this vacuum calibrating bath, the pipe is cooled, and thus solidified, through the addition of water and leaves this vacuum calibrating bath through a vacuum seal, which for its part is designed to automatically adjust to the pipe outside diameter, e.g. through a spring arrangement or through hydraulic adjustments; here also, water can be added for lubrication and sealing.

The whole production line can be automatically controlled through settings controlled, for example, by the size of the pipe widened in the vacuum suction bell; that is to say, through the prescription of a setting, for example inside the vacuum suction bell, all of the other calibrating-support and -sealing equipment fitting the outside diameter of the pipe is also set.

However, with the production line according to the invention, also in normal pipe production the actual value of the cooled-down pipe can be controlled and in the case of deviations can be readjusted.

In the following, an example of embodiment of the invention will be explained with the aid of the drawings. They show:

Fig. 1: an overall view of a production device

Fig. 2: on a larger scale, the actual suction bell